

CLAIMS:

1. An optical device for viewing an object at a range of working distances, the device having an optical axis and comprising a slender tube of a certain length and having a distal end and a proximal end, an imaging system disposed at said distal
5 end and having a wide viewing angle, and a telescopic system associated with said proximal end and having a narrow viewing angle, the imaging system being designed to form an image of said object at an image plane located on said axis and within said tube closer to the distal end than to the proximal end, the telescopic system being designed to enable viewing of said image of the object.
- 10 2. An optical device according to Claim 1, wherein said telescopic system is spaced from said image plane by not less than a half of said length.
3. An optical device according to Claim 1, wherein space between said imaging system and said telescopic system within the slender tube is filled with transparent optical media having a refraction index greater than 1.
- 15 4. An optical device according to Claim 1, wherein space between said telescopic system and the proximal end of said slender tube is filled with transparent optical media having a refraction index greater than 1.
5. An optical device according to claim 3, wherein the said transparent media is designed in the form of at least one transparent rod
- 20 6. An optical device according to claim 4, wherein the said transparent media is designed in the form of at least one transparent rod
7. An optical device according to claim 5, wherein the said transparent rod is designed to function as a part of said imaging system.
8. An optical device according to claim 6, wherein the said transparent rod is
25 designed to perform the function of the front lens of said telescopic system.
9. An optical device according to Claim 1, wherein said narrow viewing angle is defined by a width of the tube at the location of the image plane and a distance between the image plane and the telescopic system.

10. An optical device according to Claim 1, wherein said viewing angle of the imaging system is so wide and, consequently, its focal length is so short that said location of the image plane lies within the depth of field of the telescopic system over the entire range of working distances.
- 5 11. An optical device according to Claim 1, wherein the imaging system includes at least one imaging element having said wide viewing angle and at least one corrective optical element adapted to reduce distortions in said image resulting from said imaging element.
12. An optical device according to Claim 11, wherein said imaging element
10 includes a ball lens.
13. An optical device according to Claim 11, wherein the corrective optical element is a plano-convex lens.
14. An optical device according to Claim 12, wherein the ball lens has a diameter d and the imaging system is spread within the tube over a single
15 continuous length of about 2 - 3 times the diameter d , with the tube's length spanning about 10 - 100 times the diameter d .
15. An optical device according to Claim 1, wherein the device is designed to be completely disposable.
16. An optical device according to Claim 1, wherein at least one optical
20 component of the imaging system or the telescopic system is made from plastic.
17. An optical device according to Claim 1, comprising a reusable section including said telescopic system, and a disposable section in the form of said tube detachably mountable to said reusable section.
18. An optical device according to Claim 1, wherein the device is an
25 endoscope.
19. An optical device according to Claim 1, wherein the device is a borescope.
20. An optical device according to Claim 1, further including an illumination light guide designed to coaxially and contiguously adjoin said slender tube.
21. An optical device according to Claim 20, wherein said light guide is
30 composed of fiber optic strands.

22. An optical device according to Claim 20, wherein said light guide is an annular cylinder.
23. An optical device according to Claim 22, wherein said annular cylinder has an extremity processed to have a design adapted to direct the light projected
5 therefrom in a desired intensity distribution suited to the viewing angle of the imaging system.
24. An optical device according to Claim 22, further including a light guide element adapted to conduct light from a light source to the cylinder, the element being designed to match the cylinder at one end and to match the light source at the
10 other end so as to reduce loss of light.
25. A slender tube for use with the optical device defined in Claim 1.